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The data acquisition system of the XMASS experiment

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XMASS is a multi-purpose low-background experiment with a large volume of liquid xenon scintillator at Kamioka in Japan. The first phase of the experiment aiming at direct detection of dark matter was commissioned in 2010 and is currently taking data.

The detector uses ~830 kg of liquid xenon viewed by 642 photomultiplier tubes (PMTs). Signals from 642 PMTs are amplified and read out by 1 GS/s digitizers (CAEN V1751) as well as ADC/TDC modules. To reduce data size, we implemented an on-board data suppression algorithm in digitizers. The trigger is generated based on the number of hit PMTs within a 200 ns coincidence window. Recently, it is pointed out that the XMASS detector has also a great potential to detect supernova neutrino burst, and therefore several DAQ upgrades and system extensions are proceeding for this purpose.

We will present the overall design and performance of the XMASS data acquisition system and the status of DAQ upgrade for supernova neutrino burst detection.

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